

SPECIFICATION

COVER STRUCTURE FOR PORTABLE ELECTRONIC DEVICE

FIELD OF THE INVENTION

[0001] The present invention relates to a structure of an electronic device, and particularly to a cover structure for a portable electronic device.

BACKGROUND OF THE INVENTION

[0002] A wide variety of cover structures for portable electronic devices, particularly for phones, are available today. Cover structures for folding or flip phones are complicated since a hinge mechanism is necessary to pivotally connect first and second housings of the phone to allow movement between closed and open positions. Fig. 5 shows a structure for a flip phone disclosed in U.S. Pat. No. 5,761,300. Referring to this reference, a flip element 103, a rear housing portion 229 and a front housing portion 231 can be assembled together using a hinge mechanism. The flip element 103 includes a pair of hinge knuckles 203, 207 and is a one-piece integrally formed unit. Fig. 6 shows a structure of a flip 14 for a folding phone disclosed in U.S. Pat. No. 6,209,173, wherein the flip 14 comprises a front cover portion 141 and a back cover portion 142. Each cover portion 141, 142 forms a curve portion 391, 392. When the cover portions 141, 142 are assembled, the curve portions 391 and 392 engage to form a hinge tube 39 to encase a hinge mechanism. However, referring to the first reference, the flip element 103 is difficult to form in different colors, each color being distinct and having regular region boundaries therebetween since the flip element 103 is a uniform, integral structure. The flip 14 of the second reference can be easily

formed in different colors with the front cover portion 141 and the back cover portion 142 each being of a different color, and a distinct boundary being formed where the curve portions 391, 392 join to form the hinge tube 39. However, as the flip 14 rotates around the hinge mechanism, the hinge tube 39 can be easily split or broken under torque produced since the tube 39 is constituted of two separate curve portions 391 and 392.

[0003] Therefore, an improved cover structure for a portable electronic device is desired which overcomes the disadvantages of the prior art.

SUMMARY OF THE INVENTION

[0004] A main object of the present invention is to provide a durable cover structure for a portable electronic device .

[0005] Another object of the present invention is to provide a cover structure for a portable electronic device in which the cover can be multi-color with distinct region boundaries between the colors.

[0006] A cover structure for a portable electronic device comprises a back cover and a front cover, wherein the back cover forms a main joint portion, the front cover forms a shell, the main joint portion has an arcuate wall, and a cutout portion is formed on the arcuate wall. When assembling the back and front covers, a knuckle is formed by means of the shell engaging with the main joint portion on the cutout portion thereof.

[0007] Other objects, advantages and novel features of the invention will become more apparent from the following detailed description of a preferred embodiment thereof when taken in conjunction with the accompanying drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a perspective view of a cover structure assembled with a hinge mechanism in accordance with a preferred embodiment of the present invention;

[0009] FIG. 2 is an exploded, isometric view of the cover structure of FIG. 1 without the hinge mechanism;

[0010] FIG. 3 is a perspective view of one portion of the cover structure of FIG. 1;

[0011] FIG. 4 is a perspective view of the cover structure of FIG. 1 without the hinge mechanism;

[0012] FIG. 5 is an exploded, isometric view of a first conventional cover structure; and

[0013] FIG. 6 is an exploded, isometric view of a second conventional cover structure.

DETAILED DESCRIPTION OF THE INVENTION

[0014] Referring now to the drawings in detail, FIG. 1 shows a flip cover 1 for a folding mobile phone. The flip cover 1 has a back cover 10 and a front cover 20 which join together to house electronic elements, such as an LCD display 13, an earpiece (not shown), and associated circuitry. The flip cover 1 forms a knuckle 12 for encasing a hinge mechanism 2. Combining the flip cover 1 with a main body (not shown) using the hinge mechanism 2 forms the folding mobile phone (not shown). The knuckle 12 is of less width than both the back cover 10 and the front cover 20 to allow easy assembly of the folding mobile phone in the preferred embodiment. The knuckle 12 can be designed to be equal to or broader than the width of both the back cover 10 and the front cover 20, if desired.

[0015] FIG. 2 is a disassembled view of the flip cover 1 of FIG. 1. The back cover 10 includes two sidewalls 111, a bottom wall 112, a rear wall 113 and a top wall 114. A main joint portion 120 extends from the top wall 114 of the back

cover 10. The main joint portion 120 is preferably a casing tube, which includes an arcuate wall 121, a first support neck 123, and a circular channel 124 defined by the arcuate wall 121 and the first support neck 123 for receiving the hinge mechanism 2. The first support neck 123 supports the arcuate wall 121 and joins the arcuate wall 121 with the top wall 114. The arcuate wall 121 forms a cutout portion 1210 on its outer surface, and thus forms a protruding portion 1211 with a first edge 1212 between the cutout portion 1210 and the protruding portion 1211. The cutout portion 1210 defines two openings 125 therethrough and a groove 1221 for passage of conductors. Walls 111 to 114 and the main joint portion 120 together define a first receiving space 115 therebetween. In the upper space of the receiving space 115, defined by the first support neck 123, two screw hole posts 126 and a rectangular post 127 extend forwardly from the inside of the bottom wall 112. Each screw hole post 126 defines a screw hole (not labeled) therein. It is understood that the main joint portion 120 may be designed as other desired shapes instead of the casing tube, which also includes the arcuate wall 121.

[0016] Referring to FIG. 3 together with FIG. 2, FIG. 3 shows the front cover 20. The front cover 20 includes two lateral walls 211, a front wall 212, an upper wall 214 and a lower wall 213. A mating shell 22 sweeps upwardly from the front wall 212 of the front cover 20, which includes a second support neck 221 and a curve plate 222. The curve plate 222 has an inner face 2220 and a second edge 2221, which can perfectly fit respectively with the cutout portion 1210 and the first edge 1212 of the arcuate wall 121. The walls 211 to 214 and the mating shell 22 define a second receiving space 215. Two bolt hole posts 226 are formed at the second support neck 221 of the front cover 20, each defining a bolt hole (not labeled) through the front cover 20. The bolt holes through the bolt hole posts 226 correspond in position with the screw holes through the two screw hole posts 126. A holding block 227 extends forwardly from the bottom of the second

receiving space 215 corresponding in position to the post 127 and is for fixing the post 127 therein. Two projections 225 extend forwardly from the inside of the mating shell 22 corresponding to the two openings 125 and can be retained respectively in the openings 125. Two screws 30 and two caps 31 are available to fix the front cover 20 together with the back cover 10.

[0017] Referring to FIG. 4 together with FIGS. 2, 3, to assemble the flip cover 1, the front cover 20 is fixed to the back cover 10. The first and second receiving spaces 115, 215 form a housing to retain electronic elements, such as the LCD display 13, the earpiece (not shown) and associated circuitry. The mating shell 22 matches the main joint portion 120 to form the knuckle 12. Herein, in the knuckle 12, the first and second support necks 123, 221 joint together, thus the screw holes in the screw hole posts 126 align with the bolt holes in the bolt hole posts 226 and the post 127 is fixed by the holding block 227, the curve plate 222 fits in the cutout portion 1210 of the arcuate wall 121, and the projections 225 are respectively retained in the openings 125, thus the inner face 2220 thereof nestles up against the cutout portion 1210 and the second edge 2221 thereof presses close to the first edge 1212 thereby forming a regular dividing line 3 in the knuckle 12. Then, the assembly person screws the screws 30 into the bolt holes in the bolt hole posts 226 and the screw holes in the screw hole posts 126 to fix the back cover 10 and the front cover 20 together, and uses the two caps 31 to respectively cover the heads of the screws 30 to protect the screws 30 from erosion or damage. Thus, the flip cover 1 is obtained. Combining the flip cover 1 with a main body by the hinge mechanism 2 forms a folding mobile phone.

[0018] The first edge 1212 of the main joint portion 120 can be designed as a perpendicular, a slanted, or a curved surface with respect to the cutout portion 1210, and the second edge 2221 of the mating shell 22 would correspondingly be designed as a perpendicular, a slanted, or a curved section. Thus, viewed from

the side (along an axis of the circular channel 124), the junction of the first edge 1212 and second edge 2221 can be upstanding, slanted at an angle, or curved. Furthermore, a path along a top of the knuckle 12 defined by the first edge 1212 and second edge 2221 can be designed such that the dividing line 3 can be a straight line or a non-straight path (such as a wavy line, a sawtooth configuration, or any other configuration to satisfy stylistic considerations).

[0019] One or more than one openings 125 and a corresponding numbers of projections 225 can be used to meet requirements. One or more than one screw hole posts 126, bolt hole posts 226, screws 30, and caps 31 can be used, as desired. A plurality of rectangular posts 127 and holding blocks 227 can also be used. Other fastening means, such as clips, can be used to take the place of projections 225 engaging with openings 125, screws engaging with holes, or posts 127 engaging with holding blocks 227. The fastening means can be located in any workable position in the flip cover 1.

[0020] The flip cover 1 is durable and very difficult to break when rotating about the hinge mechanism 2 between closed and open positions of the folding mobile phone, since the back cover 10 and the front cover 20 are tightly fixed together as described above, the knuckle 12 is formed by the mating shell 22 perfectly fitting and fixing with the main joint portion 120, and since the main joint portion 120 is a single, integral unit which defines the channel 124 for retaining the hinge mechanism 2. The flip cover 1 can have the back cover 10 of one color and the front cover 20 of another color. Thus the flip cover 1 can be multi-colored and yet retain a distinct color boundary therebetween. The boundary is defined by the joint bounds of the covers 10, 20, including the dividing line 3.

[0021] The cover structure of the present invention can also be used in the main body cover structure of a mobile phone, if the knuckle 12 is properly designed, or can be used in other portable electronic devices.

[0022] It is understood that the invention may be embodied in other forms without departing from the spirit thereof. Thus, the present examples and embodiments are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein.